summit was some 200 or 300 yards southward of the present highest cliff, and that the shallow bank stretching to the south represents the original extension of the island.

As far as can be judged from Mr. Tufnell's sketch from the north-west and that of the *Egeria* from the south-south-east, considerable changes have taken place in two years, the different summits shown in the former having disappeared as the sea has eaten away the cliffs.

The flat to the north seems to be partly due to redistribution under the lee of the island of the material removed from the southern face. It is crossed by curved ridges from 3 to 12 feet high, which Commander Oldham considers to have been formed as high beaches during spring tides and strong winds, the flat ground between them, almost at the level of the water, being deposited under normal conditions of weather.

The island is thus gaining on one side, while losing on the other, but when the high part has gone, this partial recovery will probably cease.

A little steam issuing from cracks in the southern cliffs was the sole sign of activity, but a pool of water at a temperature of from 91° to 113° F., water which rose in a hole dug in the flat of a temperature of 128° F., and a temperature of 100° F. in a hole dug half-way up the slope, also show that the island still retains heat near the surface. The water is sea-water that has filtered through the loose ashes, and it rose and fell with the tide.

It appears by the condition of the flat that the island has neither risen nor subsided during the past two or three years.

It will be interesting to watch the ultimate fate of this last addition to the Pacific isles, but it seems probable that its existence as an island will be short unless a hard core is yet revealed.

The soundings between Falcon Island and Namuka show that they are separated by a valley 6000 feet deep.

Metis Island, 73 miles north-north-east of Falcon Island, is another volcanic cone that appeared a few years before the latter, but has not yet been examined.

W. J. L. WHARTON.

WEATHER FORECASTING.

POPULAR interest in weather prediction shows no sign of abating. The January number of the *Kew Bulletin* is devoted to an account of Herr Nowack's so-called "weather plant," and its failure as an indicator either of coming weather or of earthquakes. Very recently a lively correspondence has been carried on in the daily press on the merits or demerits of the forecasts issued by the Meteorological Office. Accordingly, some remarks on the subject in the columns of NATURE may not be out of place.

One critic says that the forecasts are little better than haphazard guesses, and that the money devoted to them would be better spent on an additional lifeboat or two on the coast. Another says the forecasts are not worth the paper they are printed on, and wishes that the Office published in the newspapers fuller accounts of the weather reported from the coasts.

The fact is that the Office is compelled by public opinion to issue forecasts. The public *will* have its forecasts, as in 1867 it would have its storm-warnings, notwithstanding the reluctance of meteorologists to issue either the one twenty years ago or the other at present. It can hardly be doubted that, for these islands at least, conscientious meteorologists would be disposed to agree with Arago, who said in 1846, and printed it in italics in the *Annuaire du Bureau des Longitudes*: "Jamais, quels que puissent être les progrès des sciences, les savants de bonne foi et soucieux de leur réputation ne se hasarderont à prédire le temps." We are, of course, speaking of forecasts based on telegraphic reports, and emanating from a central office. In every country, without exception, where forecasts for distant counties or provinces are issued from headquarters, the complaints from outlying stations, of occasional failure, are frequent enough.

The fact is that at individual stations the percentage of success may be highly satisfactory, as at Mr. C. E. Peek's observatory at Rousdon, Lyme Regis. The results for this point appeared in the *Times* of January 14, and are as follows:—

	1	2	3	4	5	6	7
1884	58·7	69·0	20·0	11·0	73·4	16·9	9·7
1885	70·0	80·0	12·0	8·0	80·0	12·0	8·0
1886	73·0	80·0	11·0	9·0	85·0	8·0	7·0
1887	75·0	83·0	9·0	8·0	82·0	11·0	7·0
1888	81·0	89·0	5·0	6·0	89·0	7·0	4·0

In this, Col. 1 is percentage of reliable wind and weather.
Col. 2 ,, ,, wind only.
Col. 3 ,, wind doubtful.
Col. 4 ,, wind unreliable.
Col. 5 ,, reliable weather.
Col. 6 ,, weather doubtful.
Col. 7 ,, ,, unreliable.

On the other hand, at other points the forecasts may be frequently unsuccessful.

In one important particular not only our own Office, but all other Offices in Europe, signally fail, and that is the quantitative prediction of rain. No one is able, apparently, to predict whether the amount of rainfall on the morrow will be a tenth of an inch or a couple of inches. No sudden floods have ever yet been foretold. By this we are not speaking of predicting the approach of floods to the lower valleys from rain which has already fallen on the upper reaches of a river, for that is not meteorological prediction at all.

With the necessarily incomplete character of the information reaching head-quarters, the wonder is that the Office can attain such success as it does. The main deficiency in the information is in its quantity, and this seems to lie at the door of the Postal Telegraph Office, which insists on being paid for its telegrams. If meteorological messages were transmitted gratis, we might expect to hear at frequent intervals from our outposts, instead of twice, or, at most, thrice in the twenty-four hours: in fact, from several stations we can only hear once, the cost of more telegrams being prohibitive. It is self-evident that such an amount of information is quite insufficient. The weather will not abstain from changing because the hour for a telegraphic report has not arrived.

The information contained in the telegrams is also deficient in quantity, for the reporters cannot, within the prescribed form of their messages, communicate all the impressions which the ever-varying appearance of the sky may have conveyed to their minds. A skilled cloud observer, who has leisure to practise his powers, is often able to form a very correct idea of what is coming for the region bounded by his own horizon, but he is quite unable to give the benefit of his observations and experience to a friend in another county by telegraphing the information.

The greatest want which the Office finds in its observers is skill in cloud observation, and it appears to be the case that a cloud observer *nascitur non fit*, and that it is next to impossible to teach the art to a new hand, at least by correspondence.

Instrumental records of the phenomena taking place in the higher strata of the atmosphere are of course unattainable, and it is only by carefully watching the upper clouds that we can gain any notion of changes taking place up there, but, by means of such watching, Mr. Clement Ley is able to predict with nearly perfect certainty the weather for the Midlands—his own neighbourhood.

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It must always be remembered that the forecasts are drawn for districts, not for individual stations; and disregarding the amount of correctness claimed by the Office by its own checking of its work, they attain a very creditable amount of success when tested by independent observers. This happens even in the summer-time, the very season at which a recent critic said that the forecasts for one month, if shuffled about, and drawn at random from a bag, would suit just as well for the next! This is proved by the results of the hay harvest forecasts, which are deduced from the reports of the recipients, practical agriculturists.

The following is the table for the season of 1888, the latest for which the figures are available:—

Districts.	Names of stations.	Percentages.			
		Complete success.	Partial success.	Partial failure.	Total failure.
Scotland, N.	Golspie and Munlochy	48	34	17	1
,, E.	North Berwick, Glamis, Aberfeldy, and Rothiemay	43	41	11	5
England, N.E. ...	Chatton and Ulceby	50	27	17	6
,, E.	Thorpe and Rothamsted	48	39	10	3
Midland Counties..	Cirencester and East Retford ...	53	32	9	6
England, S.	Horsham, Maidstone, and Downton	52	40	6	2
Scotland, W.	Dumbarton, Islay, and Stranraer	45	41	8	6
England, N.W. ...	Leyburn and Prescot	57	24	11	8
,, S.W. ...	Bridgend (Glamorgan), Clifton, Glastonbury and Spring Park (Gloucestershire)	46	36	13	5
Ireland, N.	Moynalty and Hollymount	43	38	14	5
,, S.	Moneygall, Kilkenny, Ardfert Abbey	53	31	10	6

Every year the Office hears of farmers expressing their interest in these announcements, and sending daily to the places where they are exhibited, to learn what they contain.

To give an idea of the difficulty of obtaining accurate opinions from outsiders as to the value of storm-warnings, which are a class of forecasts, it may be interesting to give some specimens of reports.

Inquiries were made in 1882, from all the stations where signals are hoisted, as to their correctness and general utility. From Tynemouth the answer was that "these signals have been, and will be, an inestimable boon to our seafaring population." From South Shields, just opposite Tynemouth, the reply to a recent official inquiry was that "the warnings were not a ha'porth of use, and that no one minded them." Each answer merely represented the private opinion of the person who uttered it.

The reader can see that there is some difficulty in picking out the actual truth from such a heap of incongruous statements as the foregoing are certain to furnish.

R. H. S.

THE LABORATORIES OF BEDFORD COLLEGE.

BEDFORD COLLEGE, in York Place, Baker Street, which was one of the earliest institutions devoted to the higher education of women, is taking a leading part in providing facilities for their instruction in science. Founded long before Oxford and Cambridge condescended to the "weaker sex" (which has since proved strong enough to attain to the highest place in the Classical Tripos), it is the result of the work of enthusiasts who would not admit the possibility of defeat. It has had to struggle not only against the inevitable difficulties due to its early foundation, but against the apathy of London. Provincial towns feel that their honour is involved in the success of their institutions. The Colleges for women at Oxford and Cambridge share in the picturesque surroundings of those old homes of learning. They attract attention and interest by their situation amid scenes and traditions of which the whole English-speaking race is proud. Bedford College has had no such advantages. London institutions are regarded as either Imperial or parochial—as too large or too small to interest its citizens as such. Bedford Square compares unfavourably with the "backs," and it is impossible to regard York Place with that gush of emotion which "the High" sets free. Thus it is that, although Bedford College has been at work since 1849, and though one in every four of the whole number of women who have gained degrees of the University of London has been a student in its classes, the work of the College does not yet receive the meed of public appreciation which it has fairly earned. Bedford College is for women what University and King's Colleges are for men. It provides, within easy reach of all Londoners, an education which is tested by the severe standard of the University of London, and bears the hall-mark of success. One-third of its students are aiming at degrees, and their presence in the class-rooms, their work in the examination-hall, guarantees the quality of the teaching they receive to class-mates who do not intend to face the same ordeal. Science has for long been taught in Bedford College, but there has been a pressing need for better laboratories and class-rooms. These the Council has now provided. A new wing has been built, dedicated to the memory of the late Mr. William Shaen, who worked long and devotedly for the College. About £2000 is required to complete and fit up this building free of all debt, and Mr. Henry Tate, who had already given £1000 to the fund, has promised to supplement it by a like amount if the Council on its part can raise the other moiety of the deficit. It is too probable that this sum will only be obtained by an exhausting effort, but surely it is not too much to hope that the public may at last appreciate the importance of promoting the higher education of women in London. In a northern manufacturing town the money would be forthcoming in a week.

As regards the laboratories, it may be sufficient to say that Dr. W. Russell, F.R.S., is the Chairman of the Council, and that they have been built under his general supervision. They appear to be in all respects suited to the purposes for which they are intended. The physical laboratory and lecture-room are on the ground floor. The former has a concrete floor, and is well lighted, partly by windows, partly by a skylight. It looks out upon East Street, and is therefore removed as far as possible from the effects of the heavy traffic in Baker Street. The chemical laboratory is at the top of the house, and opens into a class-room which is fitted with all the usual conveniences for experimental illustration.

It is surely a hopeful sign that a College for the higher education of women should now be regarded as incomplete unless it controls physical and chemical laboratories specially designed and fitted for the delivery of lectures and the performance of experiments. These Bedford College now possesses. We can only hope that it may soon possess them free of debt. The Editor of NATURE will be happy to receive and forward to the College authorities any subscriptions which may be sent to him for that purpose.

STEPHEN JOSEPH PERRY, F.R.S.

ON the evening of January 4 a telegram from Demerara announced that there had been a successful observation of the eclipse of December 22, and that Father Perry had succumbed to dysentery.

Stephen Joseph Perry was born in London on August 26, 1833, and received his early education at Gifford Hall School. Having decided to enter the priesthood, he went

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